

**Course description** from the Stony Brook University Undergraduate Bulletin:

Physics for the Life Sciences II. Second part of an introduction to physics with applications to biology, primarily for students majoring in biological sciences or pre-clinical programs. Topics include electromagnetism, optics, acoustics, and radiation phenomena. Strong algebra skills and knowledge of the ideas of calculus are required. Three lecture hours and two laboratory hours per week. PHY 122 may not be taken for credit in addition to PHY 127, 132, or 142. This course has been designated as a High Demand/Controlled Access (HD/CA) course. Students registering for HD/CA courses for the first time will have priority to do so.

*Prerequisite:* C or higher in PHY 121

*Corequisite:* CHE 132 or CHE 152

I will waive the corequisite for anybody who requests.

**Learning Outcomes:**

1. Students will demonstrate mastery of physics concepts related to electrostatics, electric and magnetic fields, elementary circuits, induction, electromagnetic waves, geometrical optics, interference and diffraction, special relativity, atomic, nuclear, and elementary particle physics.
2. Students will be able to think critically and apply appropriate physics concepts in analyzing qualitative problems in classical physics.
3. Students will demonstrate the ability to apply algebraic and calculus-based mathematical reasoning in solving quantitative physics problems.
4. Students will demonstrate proficiency in science process skills by performing experiments to measure physical phenomena and understand experimental error.
5. Students will demonstrate scientific communication skills through thoughtful discussion, collaborative problem solving, and dissemination of experimental results.

**Course Organization:**

Your instructor is Professor Peter Stephens. My office is in the Physics Building, room B-134. I will keep office hours Tuesday and Thursday from 2:30 to 4:00 and Wednesday from 10:00 to 12:00, but you are also welcome to drop in to my office at any time; I will be happy to talk to you if I am not otherwise engaged. I will also try to help you any time that you email me: [pstephens@stonybrook.edu](mailto:pstephens@stonybrook.edu). Please start the subject line with "Physics 122" so that it captures my attention.

We also have a help room, A-131 in the Physics Building, which is staffed by the lab TA's and undergraduate TA's, starting in the second week of classes. We will post a schedule in Blackboard, and on the door of the room, once the semester gets going.

There are no recitations. The lecture functions as a recitation, insofar as you are guided toward learning how to solve problems on the material in the lecture notes (posted to BB in advance) and in the homework problems

An Echo recording of the class periods will be available in the Documents section of the Blackboard course page shortly after the conclusion of each class. These recordings are a good way to review course materials, specifically to understand the “clicker” problems that will be presented in each class.

In my experience, the Echo system is not entirely reliable. Please be aware of the following two items from the Echo system information for instructors:

- “With all technology, there is the possibility of a hardware/software failure. Students should not rely on these recordings as their sole source of instruction. “
- “...failure for a recording to occur does not count as a legitimate excuse for lack of student performance.” I expect students to attend class in person.

### **Required Materials:**

1. Online access to textbook and Mastering Physics (MP). You gain access to this via Blackboard, through the tab, “Our Mastering Physics.” Instructions to register for Mastering Physics and the online edition of the texts are in the Documents section of the course page in Blackboard. Do not try to register through the Pearson website, or [www.masteringphysics.com](http://www.masteringphysics.com). Go through Blackboard, both to register at the start of the semester, and to do each homework assignment. The publisher, Pearson, has arranged a bundle of online access to MP and two texts at a cost of \$119, for the two-semester sequence, PHY 121 and 122. The main text is “College Physics: Explore and Apply” 2<sup>nd</sup> edition, by Etkina, Planinsic and Van Heuvelen. Our bundle also gives you access to another popular text, “College Physics, a Strategic Approach”, 4<sup>th</sup> edition, by Knight, Jones, and Field, with associated tutorials, videos, practice problems, etc. We will be using this as a supplementary text.
2. You will need a calculator, which you should bring to class and the lab, and especially to exams. It should be able to do scientific notation (e.g.,  $6.02 \times 10^{23}$ ), trig functions, logarithms and exponentials. Programming functions are not necessary, and indeed, you will be required to clear all memory at the start of each exam. Obviously, the calculator app on a smartphone is not acceptable during an exam. The Sharp EL-531, available for \$13.99 at the campus bookstore, is ideal. You should be familiar with its use.
3. “Clicker.” You can get a Turning Technologies response pad, or use their ResponseWare app on a smartphone. The response pad is sold in the bookstore for \$41, with a one year license, or you may be able to buy one used. In any event, you must have a TT license code, and you have to register your clicker for this course via Blackboard. Please do so before the first class meeting.
4. Access to [stonybrook.edu](http://stonybrook.edu) email and Blackboard. Make sure that you frequently check the email that you have linked to your Blackboard account. Important announcements will be sent to you via the mail link in Blackboard. See the “Electronic Communications” section of this syllabus below.

### **Grades:**

Your grade will be made up of the following parts.

- Two midterm exams, 15% each
- Final exam, 20%
- Homework via Mastering Physics, 15%
- Class participation via “clickers”, 10%
- Labs, 25%

Details of each of the above:

**Exams** will be multiple choice. The two midterm exams will be held in the evenings of Tuesday, February 25 and Tuesday, March 31, from 8:45 to 10:15 PM. The final exam is Thursday, May 14, from 2:15 to 5:00 PM.

You have to make sure there are no conflicts in your schedule – we cannot grant a makeup exam. The registrar’s policy that students have responsibility for avoiding exam conflicts is crystal clear, and exceptions will not be granted in this course. If you cannot take a midterm due to exceptional circumstances (documented illness or death in the immediate family), discuss with me as soon as possible. We will increase the weights of the other parts of the course accordingly but we do not have makeup exams. If you miss the final with a valid excuse, you will receive an Incomplete in the course and a makeup final will be scheduled as promptly as possible in the next semester. The University explicitly prohibits the final exam of the next semester’s class to be taken as a makeup, so please do not ask. Bring your calculator and plenty of pencils and erasers to the exam. You will also be able to bring one handwritten 8½” x 11” page of notes.

**Homework** problems will be assigned using an online system called Mastering Physics. Instructions to register for Mastering Physics and the online edition of the texts are in The Documents section of the course page in Blackboard. Once registered, you get there via Blackboard, through a tab labeled “Our Mastering Physics.” Do not try to use the MasteringPhysics.com website. Once there, you should see the assignments. Assignments will generally be due at 11:59 PM Sunday, typically covering the material from the previous Tuesday and Thursday class meetings. The first one is due on February 2<sup>nd</sup>. In addition, to reward students who study the material before course meetings, a 50% bonus (on the homework score) is given for all problems submitted before the corresponding lecture.

There will generally be two half-homework assignments each week, both due on Sunday of the following week. One half will have a title like “Homework due Feb 9, bonus for work submitted before class Feb 4” and the other, “Homework due Feb 9, bonus for work submitted before class Feb 6.” The deadline for bonus points will be 6:00 AM on the date of the class meeting. (One exception is the first week, where there is one assignment, due Feb 2, with bonus points awarded for all work submitted before 6:00 AM Jan 30<sup>th</sup>.) This is a true bonus, applied at the end of the term after fixing the letter grade thresholds.

The grading policy is as follows: In short answer (calculation) problems, you have ten attempts to answer the question, without any penalty for incorrect answers. For multiple choice questions, credit is reduced in proportion to the number of incorrect guesses. That is, if there are five choices, you would lose 25% credit for each incorrect answer. Some

questions offer hints, and there is no penalty for viewing them. Late submissions are not accepted, and the problems will be available for you to rework for review after their due date.

Many of the problems assigned will be of a tutorial nature, which means that you can answer them before you have mastered all of the material in the chapter. Indeed, you can probably answer some of them “cold,” before you even look at the chapter.

**“Clickers.”** You will need a response pad (they don’t actually click) for every class, starting with the first one. The bookstore sells them (\$41 with a one year license), or you can reuse one from a previous semester, or buy it from on-line retailers or elsewhere. The bookstore ones have advanced features like a qwerty keyboard and a display, which we will not be using. Simple “clickers” with fewer buttons will work fine in this course, as long as they are RF (radio frequency) technology, not infrared (IR). Or you may download and register the Turning Point app for smartphones. Whether you buy one new or reuse one from a previous semester, it needs to have a current Turning Technologies license (\$24.99 for one year, unlimited classes) and you need to register it through Blackboard. Follow the instructions (in the Blackboard documents area) to register your clicker. If your clicker breaks or you lose it, you must register the replacement again. We will have a clicker dry run in the first class (no credit) to check the registration process. We will not go back and retroactively transfer scores because of clicker problems. This is in part why we drop a number of clicker days (see below).

During the lecture, when you are working on one of the quizzes, you may discuss the problem quietly with your immediate neighbors. This is intended to help you understand the problem and solve it. “The answer is C” is not the kind of discussion intended here, as you deprive yourself of the opportunity to learn and prepare yourself for the exams.

One person operating more than 1 clicker/app (i.e., doing your friend’s clicker/app for them) is clear academic dishonesty, and will result in a report to the Academic Judiciary for the owners of both clickers. The recommended penalty will be a course grade of C- or lower.

The lowest seven clicker scores will be dropped in the grade computation. The good news is that’s 25%! The bad news is that no excuses for missing clicker scores will be accepted. So if you left it in your room, the batteries run out, or your cat (or roommate) micturates on it, that’s one of your seven dropped scores.

In most problems, any clicker response will be given credit. Sometimes, full credit will be given for a correct response, and half credit for an incorrect response. You will be advised which policy is in force for each question.

**Labs.** Further information on the organization and requirements for the labs are at <http://phylabs1.physics.sunysb.edu/introlabs/Spring2020/PHY122.html>

The laboratory is mandatory. There are ten lab sessions during the semester. All lab grades count; none are dropped. You will work together with a partner to perform the experiment, but your data analysis and lab report are to be your own work. You may not submit the same lab report as your lab partner, or anybody else.

If you have a valid (as judged by your TA) excuse for missing your regularly scheduled lab session, contact your TA immediately by email. Make-up periods are scheduled for groups of labs; you may make up a lab you missed for a valid reason only during the particular makeup period that includes that lab! Note well: you cannot make up a particular missed lab at just any of the three make-up in-lab sessions that are scheduled: you must go to the specific in-lab make-up session that is scheduled to include that particular missed lab.

There is a rigorous enrollment cap in each lab that will not be exceeded. If you cannot get the lab you want, we suggest that you register for an open lab and hope to rearrange with a section switch once classes start. But you must attend the lab for which you are registered until you have made such a switch. If you do make a switch after the 4th week of the semester, you must email Rich Lefferts to let him know, otherwise credit you received for any labs before the semester may be lost!

**Academic Integrity (individual responsibility of each student):**

Each student must pursue his or her academic goals honestly and be personally accountable for all submitted work. Representing another person's work as your own is always wrong. Faculty are required to report any suspected instances of academic dishonesty to the Academic Judiciary. For more comprehensive information on academic integrity, including categories of academic dishonesty, please refer to the academic integrity website at [stonybrook.edu/commcms/academic\\_integrity/](http://stonybrook.edu/commcms/academic_integrity/)

**Academic dishonesty will not be tolerated.** In this course, the standards are as follows:

- In lecture, whenever a “clicker” question is posed, you are invited to discuss it with your neighbors. However, one person operating two or more clickers is cheating and will result in an academic dishonesty complaint being submitted by the instructor to the Academic Judiciary against the owners of all involved clickers.
- You may discuss with your colleagues (other students or Help Room personnel) the “physics” of assigned homework problems, but you should not ask to be given nor give to others actual solutions to those problems. Such collusion hurts both parties by answers being submitted that at least one (or both) student(s) do(es) not understand.
- Your written lab reports are to be your own original work. Lab partners (or any other two students) may not turn in identical reports.
- In an exam in a lecture hall, copying answers from another person or use of materials or communication other than what is allowed by the instructors will result in a claim of Academic Dishonesty being filed against you with a recommendation that the penalty be a final grade of **C- or lower** in PHY 122.

**Electronic Communications:**

Email to your University email account is an important way of communicating with you for this course. For most students the email address is 'firstname.lastname@stonybrook.edu'. It is your responsibility to read your email received at this account. For instructions about how to verify your University email, or to forward it to a different address, see:

<http://it.stonybrook.edu/help/kb/checking-or-changing-your-mail-forwarding-address-in-the-epo>. If you choose to forward your University email to another account, I am not responsible for any undeliverable messages.

**Student Accessibility Support Services (SASC):**

The Student Accessibility Support Center (SASC) assists students and employees with disabilities in accessing the many resources of the University. Individuals with visual, mobility, and hearing impairment as well as those with hidden disabilities such as chronic medical conditions, psychological, and learning disabilities, are invited to make use of the services and equipment available. Individuals with permanent or temporary disabilities are also encouraged to consult with SASC. All requests for a disability related accommodation must be made through SASC. I cannot accept any disability related documentation from you.

SASC may proctor exams for students who have accommodations registered with SASC. Requests for such accommodations must be made by the student, to the SASC. I cannot make any disability related accommodations for exams, except as specified by the SASC. Please note that it is the responsibility of the student to schedule a seat at the SASC for each exam.

Students who require assistance during emergency evacuation are encouraged to discuss their needs with their instructors and Student Accessibility Support Center.

**Student Participation in University-Sponsored Activities:**

Students may have to miss class as a result of their participation in an event or activity sponsored by the University. This course will operate in compliance with the University policy set forth at:

[https://www.stonybrook.edu/sb/bulletin/current/policiesandregulations/policies\\_expectations/participation\\_univsponsored\\_activities.php](https://www.stonybrook.edu/sb/bulletin/current/policiesandregulations/policies_expectations/participation_univsponsored_activities.php)

In particular, you should notify me in advance, but definitely before the final date of the 'add/drop' period of your intention to miss any class, exams, or labs that will arise due to such activities. At that time, we can discuss how you will be able to secure the work covered.

**Religious Holidays:**

This course will operate in compliance with the University's policy regarding religious holidays, set forth at:

[http://www.stonybrook.edu/commcms/provost/faculty/handbook/employment/religious\\_holidays\\_policy.php](http://www.stonybrook.edu/commcms/provost/faculty/handbook/employment/religious_holidays_policy.php)

In particular, you should notify me in advance, but definitely before the final date of the 'add/drop' period of your intention to be out for religious observance. At that time, we can discuss how you will be able to secure the work covered.

**Some Important Tips for Success:**

Physics depends heavily on mathematics. At this level, you'll need working familiarity with trigonometry and algebra, and a preparation to understand the ideas of calculus. So it is very important for your success that you meet the course prerequisites. Actually, calculus was invented to solve physics problems, and so I hope this course helps you understand some of the math you may have struggled to see the point of. (That's how it worked for me, when I was a college student.)

Be familiar with your calculator, and use the same one for exams that you bring to class and the lab, and that you use for homework. You don't want to be spending valuable exam time figuring out how to use your calculator!

Keep up to date with the material. We have to move fast to cover everything, and it mostly builds on earlier topics.

Read the book in advance of the lectures, and turn in as many of the homework problems as you can early for bonus credit, as explained above.

Stony Brook University and I believe that students should expect to spend an average of two hours per week of outside preparation for each course credit. That means a total of eight hours outside of class every week, reading the text, doing homework, preparing for your labs, completing lab reports, seeking help from the TA's and myself, reviewing for exams, etc.

Do the homework! Don't just use Bing, Chegg, Google, etc. to look up the answer. It may be a quick way to finish the assignment, but it won't nourish your understanding, and you're not likely to retain the concepts. Most of our exam problems are going to come pretty directly from the homework.

Most of the course administration will be done via Blackboard. Please make sure that you have access to your Stony Brook Blackboard account, that this course is listed there, and that the email address listed in your Blackboard account is one that you monitor. You have to register your "clicker" via Blackboard; see above. The course calendar is available in Blackboard

I encourage you to come to my office hours, email me with questions, and go to the Help Room!